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## A CASE OF ANTHRAX\*

### PLATE 17

G. G. REINLE AND R. A. ARCHIBALD

*From the Research Department of the Western Laboratories, Oakland, California*

As anthrax in man is of rather rare occurrence, the following case is deemed worthy of report.

On June 3, 1916, Dr. L. A. Covel, a veterinarian, examined a cow that had died with clinical manifestations of anthrax. An ear removed from the cow for bacteriologic examination, revealed in smears and cultures the presence of *Bacillus anthracis*. Three days later Dr. Covel observed 4 small macules about the size of flea bites, and somewhat resembling them, on his right forearm. These eruptions were ushered in with a sensation of local burning and itching. In a few days they began to take on the characteristics of malignant pustules. The lesions, which were originally flat, began gradually to increase in size, and to project above the surface of the skin in the form of dark-purplish papules. At about this time a fifth pustule appeared and the whole arm commenced to swell.

On June 9 he placed himself under our care. The lesions, some of which were vesicular and some pustular in character, were immediately opened and a small quantity of seropurulent fluid discharged. Smears and cultures from each of the pustules showed large numbers of bacilli morphologically similar to *B. anthracis*. A diagnosis of anthrax was made, which was later confirmed by the cultures. The patient was removed to a hospital and immediately given 20 c.c. of antianthrax serum fresh from a hyperimmunized horse. The temperature at the time of admission to the hospital was 100.2, pulse 90. The arm was soaked in hot bichlorid solution, and then a Bier bandage was applied.

June 10.—Antianthrax serum was administered (25 c.c.), and the bichlorid soaking and Bier bandage were continued at intervals. The patient complained of backache and soreness in the extremities like that in an attack of grippe. The pustules at this time had assumed an appearance very characteristic of malignant pustules; that is, the central portion of the lesions was composed of dark-brownish, almost black, necrosed tissue, which made up about one-third of the entire lesion and was surrounded by a deep-red border, the whole being raised considerably above the surface of the skin.

Temperature: 7:30 a. m. 101, pulse 78; 5:30 p. m. 101.6, pulse 80; 10:45 p. m. 102, pulse 78.

Blood count: white cells 14,800; large mononuclears 3%; small mononuclears 7%; polymorphonuclears 89%; red cells 4,390,000; basophils 1%; hemoglobin 80%; color index 0.9+.

June 11.—Antianthrax serum (28 c.c.) was administered. Backache somewhat relieved. Inclined to sleep all the time. Pustules assuming a blackish appearance with well-defined borders. Arm still badly swollen, probably as a result in part of the Bier bandage.

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Temperature: 7:30 a. m. 102.4, pulse 76; 12:15 p. m. 103, pulse 86; 3:45 p. m. 102, pulse 84.

Blood count: white cells 14,800; large mononuclears 4%; small mononuclears 5%; polymorphonuclears 90%; red cells 4,000,000; basophils 1%; hemoglobin 80%; color index 1.

June 12.—Antianthrax serum (30 c.c.) administered; bichlorid soaking continued. Feeling better; no backache and no pain in extremities; complained of cold feet and severe headache at all times. Pustules had become blacker and slightly raised. Arm still swollen.

Temperature: 7:30 a. m. 99.4, pulse 84; 1:00 p. m. 100.6, pulse 86; 3:45 p. m. 100.6, pulse 88.

Urine showed slight trace of albumin.

June 13.—Antianthrax serum (30 c.c.) administered. Patient much better. Pustules were still rising and a well-marked bright-reddish zone had developed about the periphery of the lesions. Swelling in arm not so marked.

Temperature: 7 a. m. 98.6, pulse 70; 1 p. m. 98.6, pulse 84; 4 p. m. 98, pulse 80.

Blood count: white cells 14,200; large mononuclears 7%; small mononuclears 11%; polymorphonuclears 80.5%; eosinophils 1.5%; red cells 4,520,000; hemoglobin 80%; color index 0.8 +.

June 14.—No serum given. Pustules at this time showed a black center surrounded by a white border and outside this an intensely red zone. Swelling on arm receding. Photographs in natural colors taken.

Temperature: 7 a. m. 97.6, pulse 68; 12 m. 97, pulse 68; 4 p. m. 97.6, pulse 68.

Blood count: white cells 11,600; large mononuclears 2.5%; small mononuclears 13%; polymorphonuclears 82%; eosinophils 2%; basophils 0.5%; red cells 4,310,000; hemoglobin 80%; color index 0.9 +.

June 15.—Antianthrax serum (30 c.c.) administered. Swelling disappearing. Pustules had a tendency to dry and form a hard crust. Patient feeling well.

Temperature: 7:30 a. m. 97.4, pulse 68; 12:00 m. 97.4, pulse 62; 4:00 p. m. 97.4, pulse 62.

Blood count: white cells 11,000; large mononuclears 9%; small mononuclears 15%; polymorphonuclears 69%; eosinophils 7%; red cells 4,080,000; hemoglobin 80%; color index 1.

June 16.—Blood count and temperature showed some disturbance, which was accounted for by the fact that, the lesions being completely sealed by crusts, the contents could not be discharged on the surface, but drained into the dependent subcutaneous tissues.

Temperature: 7 a. m. 98.6, pulse 70; 12 m. 98.6, pulse 70; 4 p. m. 98.6, pulse 70.

Blood count: white cells 16,200; large mononuclears 5%; small mononuclears 5%; polymorphonuclears 90%; red cells 4,060,000; hemoglobin 80%; color index 1.

June 17.—Scabs were raised to allow secretions beneath to drain. Smears and cultures from secretions showed no infection present.

Temperature: 7 a. m. 98, pulse 70; 12 m. 98, pulse 72; 4 p. m. 97.6, pulse 72.

Blood count: white cells 11,600; large mononuclears 19%; small mononuclears 17%; polymorphonuclears 55%; eosinophils 9%.

June 18.—Patient discharged from hospital. Urticaria developed due to the action of the horse serum. This disappeared within 24 hours after the administration of a dose of leukocytic extract subcutaneously, and the administration of bicarbonate of soda by mouth.

Temperature: 7 a. m. 98, pulse 70; 12 m. 98.6, pulse 72.

Blood count: white cells 10,600; large mononuclears 21%; small mononuclears 13%; polymorphonuclears 62%; eosinophils 4%.

The pustules from this time on were treated as simple wounds, and the patient made an uneventful recovery.

#### DISCUSSION

This case is remarkable in that there were in all 5 pustules on the patient's arm, and excision, which most authorities believe to be the classical method of treatment, was not resorted to. Antianthrax serum, it appears, played an important rôle in bringing about recovery. Following the first dose of serum all the lesions became less progressive in appearance, and the progress of the fifth pustule, which appeared on the day treatment was commenced, was arrested immediately. Furthermore, the temperature curve seems to have been influenced by something other than the patient's own reactive powers; it gradually ascended until it reached the maximum of 103 F. 36 hours after the use of the antianthrax serum had been commenced, and then decreased as immunity and convalescence became established, reaching normal in about the 84th hour.

Another interesting point is that on the 7th day after the serum treatment had been commenced, smears and cultures from secretions underneath the crusts, which were raised to permit drainage, failed to reveal the presence of the anthrax bacillus or of any other infection.

Coincident with improvement in the patient's condition the eosinophils became a factor in the blood picture. On June 13 and 14 the percentage of eosinophils increased; on June 15, when the blood count, temperature, and clinical manifestations showed signs of relapse due to drainage of secretions from the pustules into the neighboring subcutaneous tissue, the eosinophilia disappeared. When this situation was relieved, the eosinophilia reappeared and then gradually subsided as convalescence progressed. Just what the significance of the eosinophilia is we, of course, are at a loss to explain, but we deem the fact worthy of special mention.

#### EXPLANATION OF PLATE 17

Malignant anthrax pustules 11 days after infection had occurred, and 8 days after the first lesions had appeared. The photograph in natural colors was taken by Dr. David Hadden.

PLATE 17



Figure 1



Figure 2